

NASA TECH BRIEF



NASA Tech Briefs are issued to summarize specific innovations derived from the U.S. space program, to encourage their commercial application. Copies are available to the public at 15 cents each from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

Two-Functional Seal for Hose Connection

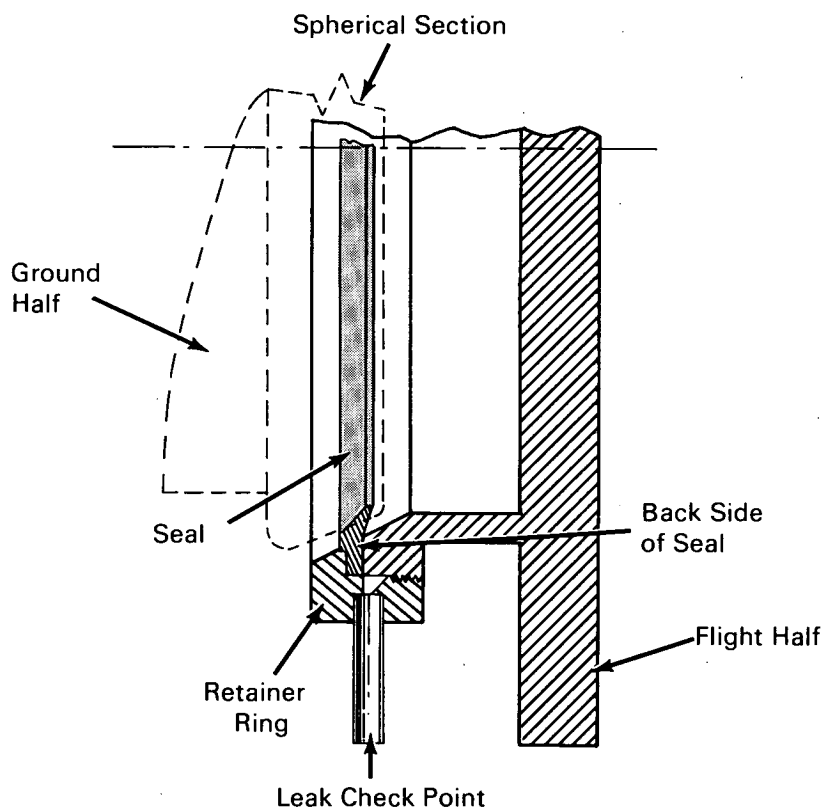


Figure 1. Cross-Sectional View of the Seal in Place

The problem:

Prevention of leakage of liquid hydrogen from hose connectors. For charging of a rocket's fuel tank with liquid hydrogen (or drainage), the tank is coupled with a vehicular tanker by way of a flexible hose whose inner diameter is between 4 and 5 in. Sealing of the poppet-type connection, between the ground half of stainless steel and the flight half of aluminum, must withstand as much lateral offset as 1/8 in., loading

on the hose as great as 490 lb, internal pressures between 4 and 110 lb/in² (gauge), and temperatures between ambient and -405°F. The trouble was leakage of the hydrogen, especially at the higher pressures and lower temperatures.

The solution:

A novel seal was designed, machined from a certain plastic material. For one of two functions it serves

(continued overleaf)

as a block-type seal (the main seal), supporting the maximum loading of the poppet with only slight elastic deflection; otherwise it serves as a lip-type seal, elastic relative to the main seal, that is deformed elastically in bending, tension, or compression (or any combination of these three) by the seated poppet; thus the ever-present elastic force tends to maintain effectively sealing contact with the poppet.

This combination of functions is thought to be novel; the lip does not depend for its efficiency on internal pressure. Extensive tests in the laboratory and in the field have shown the seal to be fully effective under the most severe conditions described.

Note:

No further documentation is available. Inquiries may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B69-10588

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: M. B. Richardson of
Douglas Aircraft Company, Inc.
under contract to
Marshall Space Flight Center
(MFS-14062)

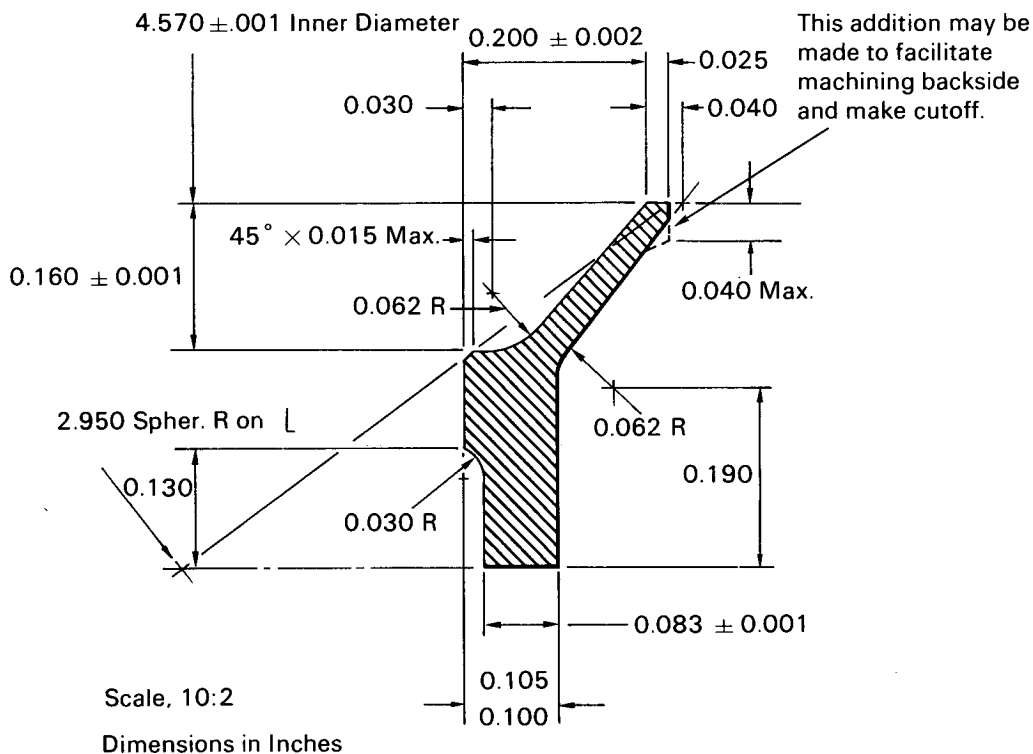


Figure 2. Cross Section of Seal